



**US Army Corps
of Engineers®**

Engineer Research and
Development Center

Monitoring Completed Navigation Projects Program

Description of Research

ERDC's [Coastal and Hydraulics Laboratory \(CHL\)](#) provides day-to-day technical work and management of the USACE Headquarters-funded [Monitoring Completed Navigation Projects \(MCNP\) Program](#), which involves the evaluation of completed civil works navigation projects, both coastal and inland. The program's objective is to obtain information for verifying or improving navigation project performance. Monitoring is conducted to determine if Operation and Maintenance (O&M)-funded projects are functioning as designed to improve design procedures, construction methods, and operations and maintenance techniques. Monitoring efforts look at hydrodynamics (waves, tides, and currents), sedimentation (erosion and accretion), and/or structural elements of projects to determine if they are performing as intended. Monitoring may be



Waves breaking over Moro Bay, California, north breakwater

conducted as either a comprehensive detailed survey to verify postconstruction conditions on a one-time basis, or a continuous collection of prototype data over an extended period. Thirty-two project sites have been monitored through the MCNP Program, which include coastal sites on the Atlantic, Pacific, Gulf of Mexico, and Great Lakes as well as Alaska, Hawaii, Guam, and Puerto Rico. Inland navigation projects include monitoring of locks, dams, and riverine training structures. There are currently eight active projects being monitored by the MCNP Program.

Problem

Design deficiencies can result in structure failure and/or high maintenance costs. The Corps operates and maintains more than 800 navigation projects encompassing more than 25,000 miles of waterway. It is necessary to learn definitively if elements used in design of these structures are appropriate for the conditions under which they were applied. If not, the knowledge gained will provide guidance for development of new technologies that will be more applicable to the conditions existing at a particular site. Monitoring is conducted for not only new structures but also those that are undergoing extensive

rehabilitation as a result of unacceptable performance or structural failure because of adverse environmental conditions.

Expected Products	Periodic data sets are being developed and used to improve knowledge in design, construction, and maintenance of both existing and proposed coastal and inland navigation projects. Knowledge gained from monitoring and analysis of a finite small number of specific structures provides not only site-specific lessons learned but also results in generic guidance applicable to a significant region of coastline or navigation channel that experiences essentially the same range of environmental factors and other parameters.
Potential Users	The MCNP Program findings apply to completed projects operated and/or maintained by the U.S. Army Corps of Engineers nationwide.
Projected Benefits	The program is designed to determine how well projects are accomplishing their purposes and how they are resisting attacks by their physical environment. Relatively low-cost remote sensing tools and techniques, with limited ground truthing surveys, are among the primary inspection tools used in the monitoring efforts. Periodic aerial photographs are compared visually to gauge the degree of additional in-depth analysis required to quantify structural changes (e.g., armor unit movement). The determination, combined with concepts and understanding already available, lead to creating more accurate and economical engineering solutions to coastal and hydraulic problems; to strengthening and improving design criteria and methodology; to improving construction practices and cost-effectiveness; and to improving O&M techniques. Information collected and analyzed on a national basis documents successful designs, disseminates lessons learned on projects with problems, and provides upgraded field guidance that will reduce life-cycle cost on a national scale.
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Participating ERDC Laboratories	Coastal and Hydraulics Laboratory (CHL), Geotechnical and Structures Laboratory (GSL)